

REMARKS

Summary of Amendments

Claims 1 and 17 have been amended to more particularly point out and distinctly claim the present invention. Additionally, in claim 17 editorial corrections have been made.

No claims are canceled; claims 1-20 remain pending.

Claim Objections

Claim 17 was objected to for certain informalities—namely, two editorial errors. These errors have been corrected, as just noted.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 2, 5, 6, 9, 10, 13, 14, 17 and 18: *Sato et al.*

Claims 1, 2, 5, 6, 9, 10, 13, 14, 17 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sato et al.* (Japanese Unexamined Pat. App. Pub. No. 2002-134484, machine translation).

The rejections made in the first Office action, dated November 27, 2006, on the merits have essentially been upheld. In response to that action, Applicant amended claim 1 to recite: "the recess including a perimetric wall and a substantially planar bottom face." Under "Response to Arguments" on page 6 of its current action, the Office states, "Figure 4 of *Sato et al.* clearly shows that the bottom face of the susceptor is 'substantially planar,' as presently claimed."

While flat portion 37 of hollow 39 in Fig. 4 of *Sato et al.* does appear to be planar, the bottom face of the hollow 39 is not globally planar. Claims 1 and 17 have each been amended to exclude a substrate-retaining-face configuration such as illustrated in Fig. 4 (and described in paragraph [0028]) of *Sato et al.* Namely, these two independent claims now recite that "the bottom face [is] sized to receive a back side of the wafer such that the back side is in contact with the bottom face across substantially the entire diameter of the wafer."

Applicant notes that the wafer-and-susceptor positional relationship that is of concern in *Sato et al.* is depicted in Fig. 4. According to the illustration, in the contact of the wafer underside along its outer margin, with *Sato et al.*, in contrast to the present invention in which the entire surface globally is in contact, a flat

contacting portion does not exist, wherein the contact is limited to being linear—that is, along a circle—as opposed to planar.

It is clear that due to this form of wafer-susceptor contact, propagation of heat from the susceptor to the wafer does not take place, such that the heating efficiency would be remarkably poor.

Moreover, as a consequence of this circular form of contact, the interval between the wafer underside and the susceptor is unstable, on account of which the separation between the wafer underside and the susceptor is nonuniform, which means that the convection currents and heat radiation originating in the propagation of heat from the susceptor to the wafer are unstable, such that the temperature uniformity inevitably will be unstable.

In sum, with *Sato et al.*, owing to the presence of an interstice between the susceptor and the wafer underside, heat transmission cannot take place adequately, such that heating efficiency is remarkably poor.

In rejecting claims 1, 2, 5, 6, 9, 10, 13, 14, 17 and 18 over *Sato et al.*, the Office alleges that in paragraph [0024] *Sato et al.* teaches that varying the angle formed by the wafer-pocket perimetric wall and bottom surface, or varying the radius of curvature where these two features join, is "result effective." Paragraph [0024] of *Sato et al.* actually states, however, "by varying the radius of curvature of the inclined surface 24 according to the diameter of the processed substrate, the separation A can be maintained at a predetermined value." Thus, the result that *Sato et al.* teaches varying the radius of curvature will effect is *not* temperature uniformity across the wafer pocket when the susceptor is in operation (when heating at 500°C), but rather is the separation between the wafer backside and the susceptor wafer-carrying surface.

Hence, it is respectfully submitted that the Office has not made a *prima facie* case that prior to Applicant's invention it was known that varying the angle and/or radius of curvature between the bottom face and the perimetric wall of the wafer pocket in a susceptor would effect any result on the susceptor's temperature uniformity. In this crucial regard, the prior art of record is totally silent.

Moreover, the novel results effected according to the present invention are particularly pronounced in a configuration as recited claim 9. These results were achieved, as set forth in the present specification, with Samples 4 and 5 in Table I, Embodiment 1; with Samples 14, 16 and 17 in Table II, Embodiment 2; with Samples 24, 26 and 27 in Table III, Embodiment 3; with Samples 33, 35, 36, 41, 43, 44, 49, 51, 52, 57, 59 and 60 in Table IV, Embodiment 4; and with Samples 66, 68 and 69 in Table V, Embodiment 5.

For the foregoing reasons, it is respectfully submitted that the rejection of claims 1, 2, 5, 6, 9, 10, 13, 14, 17 and 18 over *Sato et al.* in light of the knowledge of, or even what might be routine experimentation by, a person skilled in the art has been overcome.

Claims 3, 4, 7, 8, 11, 12, 15, 16, 19 and 20: *Sato et al.* in view of *Soma et al.*

Claims 3, 4, 7, 8, 11, 12, 15, 16, 19 and 20 were rejected as being unpatentable over *Sato et al.* as applied in making the rejection addressed above, in view of U.S. Pat. No. 5,231,690 to *Soma et al.*

Applicant notes that *Soma et al.* discloses a wafer heater made of a ceramic, but is silent as to, and makes no suggestion of, a configuration in which the sidewall angle is made 90-170°C as set forth in claim 1 of the present application.

Moreover, since the claims rejected over *Sato et al.* in view of *Soma et al.* each depend either directly or indirectly from claim 1 and thus carry with them all of the limitations of claim 1 and any intervening claims, and since claim 1 is, for the reasons argued above, believed to be allowable, claims 3, 4, 7, 8, 11, 12, 15, 16, 19 and 20 should be held allowable.

Claims 1-20: *Hirotake et al.* in view of *Soma et al.*

Claims 1-20 were rejected as being unpatentable over *Hirotake et al.* (Japanese Unexamined Pat. App. Pub. No. 2000-290773, machine translation) in view of *Soma et al.*

Applicant notes that *Hirotake et al.* manufactures, in the form illustrated in the drawings, bulk substance by chemical vapor deposition. *Hirotake et al.* is cited to allege that the disclosure therein of a susceptor having a sloping-walled recess meets the general conditions of Applicant's claims. Yet *Hirotake et al.* merely teaches inclining the wall of the recess so that the thick ceramic coating formed onto the susceptor will not crack or separate from the susceptor along the contour of the recess.

And as noted earlier, *Soma et al.* discloses a wafer heater made of a ceramic, but is silent as to, and makes no suggestion of, a configuration in which the sidewall angle is made 90-170°C as set forth in claim 1 of the present application.

In sum, the prior art of record is totally silent as to the combination of configurational features now recited in the independent claims of the present application. That is, the combination of the special angle formed by, and/or the special radius of curvature between, the bottom face and the perimetric wall of the wafer pocket, and, as now recited in claims 1 and 17,

the bottom face being sized to receive a back side of the wafer such that the back side is in contact with the bottom face across substantially the entire diameter of the wafer.

It is respectfully submitted that claims 1 and 17 as amended distinguish the recited subject matter over not only *Sato et al.* by disclaiming configurations as taught therein, but also over the *Hirotake et al.* by positively reciting a combination of configurational features neither anticipated nor suggested by the reference alone or in combination with *Soma et al.* And it follows that the remainder of the claims, being properly dependent on claim 1, rejected under the presently addressed section of the Office action also distinguish over *Hirotake et al.* and *Soma et al.*, and should therefore be held allowable.

Accordingly, Applicant courteously urges that this application is in condition for allowance. Reconsideration and withdrawal of the rejections is requested. Favorable action by the Examiner at an early date is solicited.

Respectfully submitted,

January 14, 2008

/James Judge/

James W. Judge
Registration No. 42,701

JUDGE PATENT ASSOCIATES
Dojima Building, 5th Floor
6-8 Nishitemma 2-Chome, Kita-ku
Osaka-shi 530-0047
JAPAN

Telephone: **305-938-7119**
Voicemail/Fax: **703-997-4565**